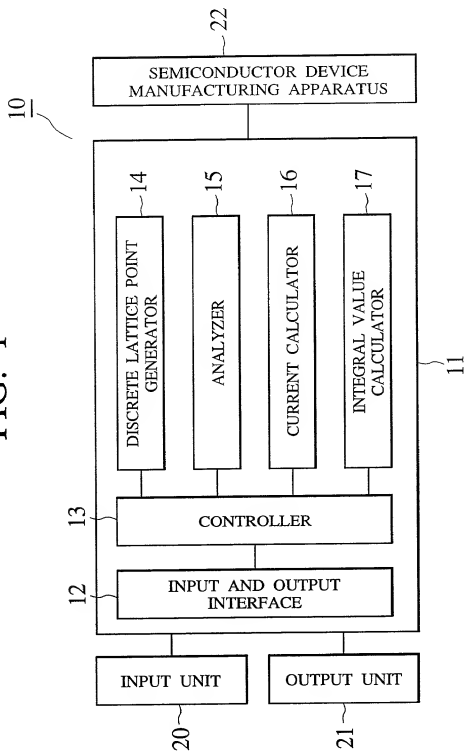


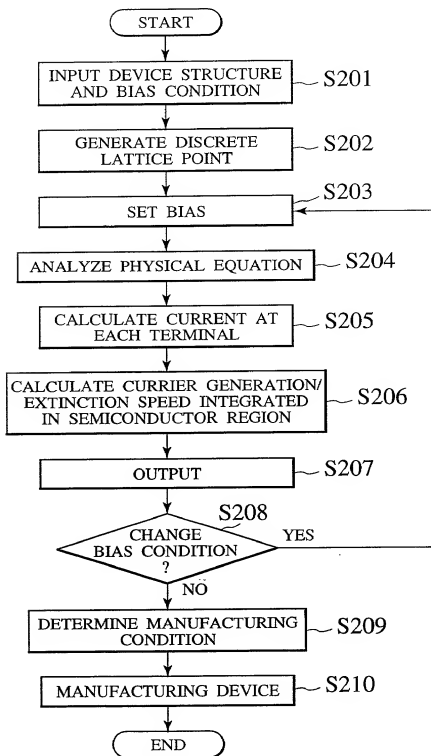
1/7

FIG. 1



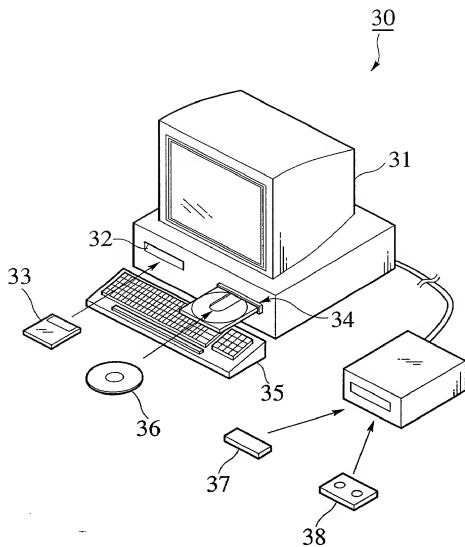
2/7

FIG. 2



3/7

FIG. 3



4/7

FIG. 4

(DEVICE STRUCTURE)

IMPURITY CONCENTRATION  
OF P-TYPE SUBSTRATE  $3 \times 10^{17} \text{cm}^{-3}$

GATE OXIDE FILM THICKNESS 6nm

GATE ELECTRODE N-TYPE POLYSILICON

GATE LENGTH  $0.3 \mu\text{m}$

SOURCE/DRAIN DIFFUSION LAYER  
MAXIMUM CONCENTRATION  $1 \times 10^{20} \text{cm}^{-3}$

SOURCE/DRAIN DIFFUSION LAYER  
JUNCTION DEPTH  $0.08 \mu\text{m}$

DEVICE WIDTH  $1 \mu\text{m}$

5/7

FIG. 5A

	NO GR	SRH ONLY	II ONLY	BBT ONLY	ALL
SOURCE CURRENT	4.08E-17	1.38E-17	1.37E-17	4.17E-19	1.29E-18
DRAIN CURRENT	4.07E-17	6.78E-17	6.72E-17	9.45E-14	9.63E-14
SUBSTRATE CURRENT	3.37E-18	9.41E-18	1.72E-18	9.45E-14	9.62E-14

FIG. 5B

SOURCE CURRENT	1.29E-18
DRAIN CURRENT	9.63E-14
SUBSTRATE CURRENT	9.62E-14

MECHANISM	VOLUME INTEGRAL VALUE X PRIME CHARGE
J <sub>SRHn</sub>	1.50E-17
J <sub>II n</sub>	1.68E-15
J <sub>BBTn</sub>	9.45E-14

6/7

FIG. 6A

	NO GR	SRH ONLY	II ONLY	BBT ONLY	ALL
SOURCE CURRENT	4.08E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
DRAIN CURRENT	4.08E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
SUBSTRATE CURRENT	4.66E-18	1.59E-17	4.33E-08	4.66E-18	4.33E-08

FIG. 6B

SOURCE CURRENT	4.48E-04
DRAIN CURRENT	4.48E-04
SUBSTRATE CURRENT	4.33E-08

MECHANISM	VOLUME INTEGRAL VALUE X PRIME CHARGE
$J_{SRHn}$	4.78E-14
$J_{IIn}$	4.33E-08
$J_{BBTn}$	0.00E+00

7/7

FIG. 7A 
$$\frac{\delta n}{\delta t} = \frac{1}{q} \vec{\nabla} \cdot \vec{J}_n + GR_n$$

FIG. 7B 
$$GR_n = GR_{SRHn} + GR_{IIn} + GR_{BBTn}$$

FIG. 7C 
$$A_{SRHn} = \int_{Si} GR_{SRHn} dv$$

FIG. 7D 
$$A_{IIn} = \int_{Si} GR_{IIn} dv$$

FIG. 7E 
$$A_{BBTn} = \int_{Si} GR_{BBTn} dv$$

FIG. 7F 
$$J_{SRHn} = q \int_{Si} GR_{SRHn} dv$$

FIG. 7G 
$$J_{IIn} = q \int_{Si} GR_{IIn} dv$$

FIG. 7H 
$$J_{BBTn} = q \int_{Si} GR_{BBTn} dv$$